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POPULAR MECHANICS

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"Tells you how to do things." Written so you can understand it.

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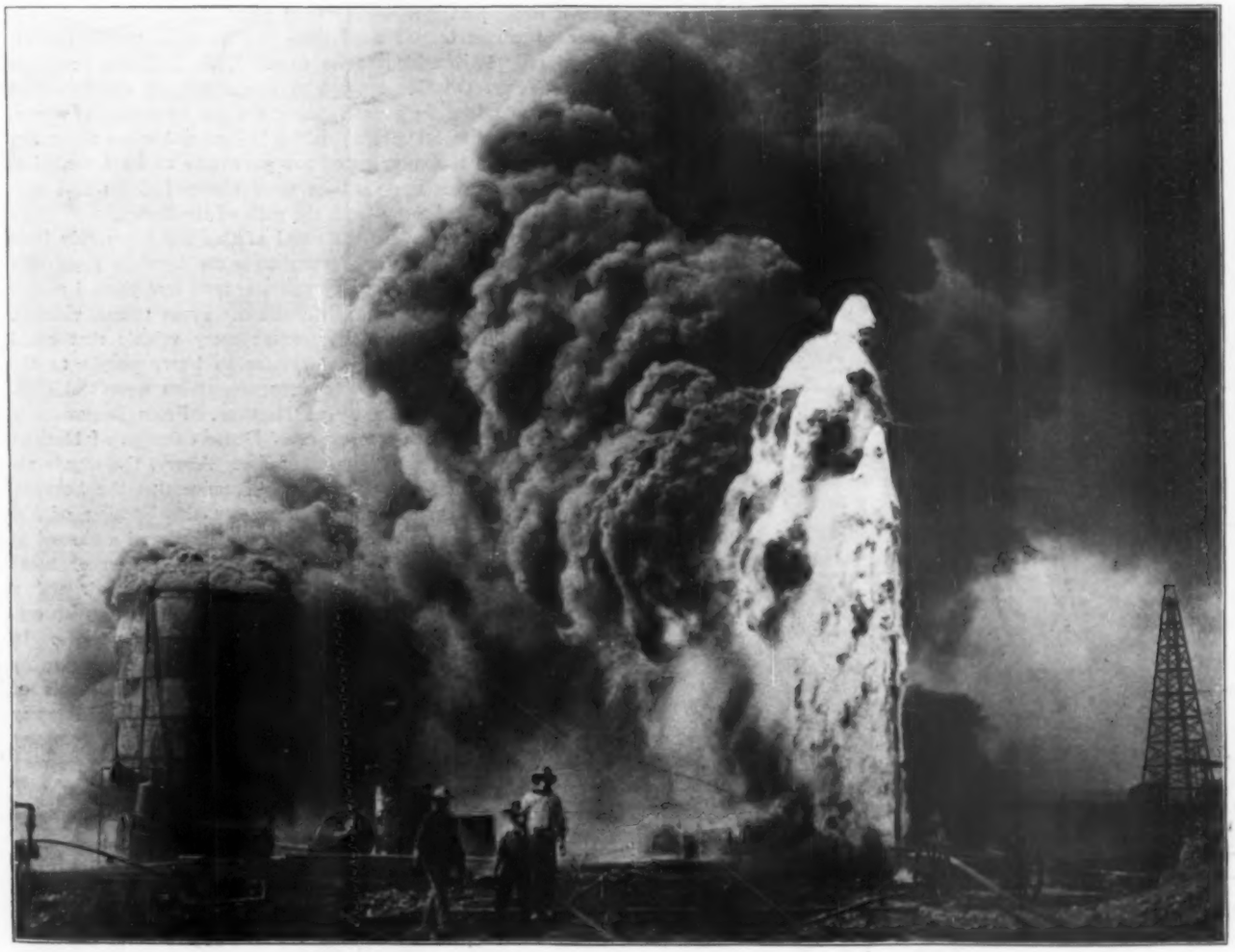
The Great Oil Fire at Beaumont



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"At Times Great Geysers of Flame Leaped 200 Feet in Air"

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Fate Fought with the Fire Fighters

Nature in Mysterious Ways Aided in Subduing the Flames in the Beaumont Oil Fields

The American continent stood appalled on that night of Thursday, Sept. 11, when the news was flashed over the wires that the Beaumont oil fields were on fire. These oil fields, the discovery of which had marked a new epoch in American commerce; made millionaires of paupers; enriched the state of Texas and placed the United States second only to Russia as an oil producing country, were threatened with annihilation—already doomed to utter destruction, according to the sensational reports of the yellow journals, as if the facts of conflagration were not terrible enough without exaggeration. True enough when the fire had gained headway it seemed that it must consume all in its path.

But providence seemed to combine with American intrepidity

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Flora-Texas Well on Fire.

to save the great fields from destruction. The winds that had blown briskly during the day suddenly lulled—a strange occurrence, and contrary to nearly all precedent—and when the flames were at their height there was scarcely a breath of air astir. A wind at this time would have swept every tank and derrick from the field and completed the work of devastation. Another mysterious performance of nature in aiding the fire-fighters was the sudden suppression of the burning of the Flora-Texas flowing well. After this well had been spouting great walls of flame 200 feet into the air for three days and nights, and when the entire force of the fire-fighters was about to be leveled on this one fire, the well suddenly ceased to gush. The geyser of fire quietly sank to the ground level and went out as if nature had turned off the hydrant that supplied it with the liquid fuel. This phenomenon yet remains unsolved. There was a line of three-inch pipe in the well and some say it was choked up at the bottom; another explanation is that flow of oil became gradually heavier, finally growing so burdensome that the gas pressure was not sufficient to raise it to the surface. Both of these theories, however, are derided by many old time oil experts and they say the occurrence defies human explanation.

Twenty companies with stockholders in all parts of America and Europe suffered loss from this great oil fire. Conservative estimates of the total actual loss places it at $240,000. It would have reached into the hundreds of millions and become a national calamity but for its early suppression.

To fight this field of fire new and entirely original methods had to be employed. The usual system of hose and engine and ladder companies would have been worse than useless. Had a river of water been turned onto the mass of burning oil it would only have added to its fury. J. S. Cullinan, president of the Texas Oil Company, who was appointed supervisor of the work, devised a plan of fighting the fire by means of steam. Steam lines were laid from thirteen boilers and when the steam was turned on the columns of fire gave way to its force. Levees were thrown up, derricks were chopped down and machinery was hauled away from the path of the flames.

In spectacular grandeur the equal of this fire has rarely been seen. Emblazoned in the heavens were the heraldic signs that told the story to all for many miles around and caused people to rush to the scene from all directions. From towns, villages, hamlets and farm houses they came; every vehicle that could be equipped was brought into service to hurry people to the central point of the spectacle; excursion trains were run from points in Texas as far away as Houston. From Beaumont it looked as if the earth was on fire. Dense columns of blackest smoke hung over the wide area of fire. Above, the clouds reflecting the glaring red, gave the appearance that the heavens, too, were burning. Approaching nearer the burning of the separate wells and tanks could be distinguished and a shroud of black hung overhead. Twenty-nine derricks, fifteen or more pumping rigs, one 37,500-barrel steel measuring tank and a dozen or more wooden settling tanks were sending great columns of flame and smoke into the blackened canopy above. In the center of the view, like a huge geyser of flame, the flowing well of the Flora-Texas Oil company, hurled its sheets of liquid flame against the inken sky. Four hundred yards away the huge 37,500-barrel storage tank of the Higgins company belched forth a great globe of fire that awed the spectators with its terrifying grandeur. All about from tanks, derricks and well rose the low rumbling flames, making a field of fire that seemed to mock the efforts of men to curb its progress.

As mysterious as its subjugation, was the origin of this strange and magnificent fire. It has been said that a watchman walking near the Higgins tank fell with a lighted lantern in his hand setting fire to the oil. This report has never been confirmed, and the fact that the Keith-Ward property 300 yards away had been burning before this tank was ignited seems to disprove this theory. As no breeze was blowing at the time it is considered impossible that one of these fires could have been started from the other. The real cause of the fire will probably never be known. The illustrations give a good idea of the spectacle, as it appeared at daylight of the first day of the fire.

The Battleship Des Moines is the finest exponent of the "Denver" type of fighting vessel. Ten 5-inch, fifty caliber, rapid fire, breach-loading guns constitute her main battery.

Popular Mechanics tells you how to do things.

Copyrighted 1902 by F. J. Trost. Lower Portion of Higgin's 37,500 Barrel Tank.

IMPORTANCE OF THE CHINESE LANGUAGE.

3,000 Marks for Mercantile Use Easier than any Ordinary Language.

By Charles Neur, United States Consular Agent at Gera

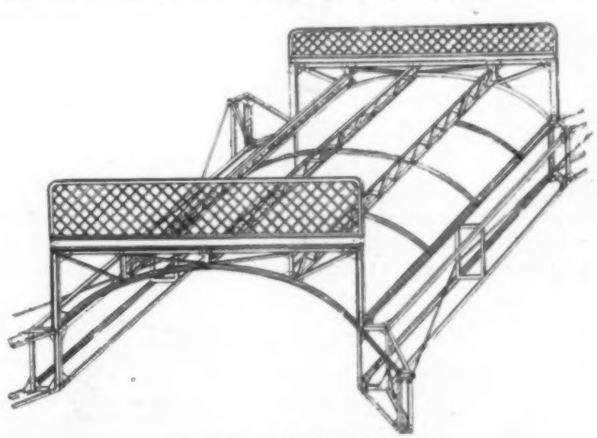
While China is considered the land of promise for our manufacturers and farmers, the importance of the knowledge of the Chinese language is greatly undervalued. In order to enter into permanent commercial relations with a foreign country it is indispensable to know its language. The Chinese language is ideographic. It conveys the idea and not the word for a thing, as the figure "8" represents the idea and not the word. The Chinese have invented more than 40,000 marks for their writing. In the opinion of my informant it will require only about 3,000 marks for mercantile correspondence, and it will be easier to learn them than the words of an ordinary foreign language. An exact instruction in one of the Chinese languages can only be given by a Chinaman. Besides the professor for the theory of language, there are four Chinese linguists in the Oriental seminary of Berlin teaching the business style and the languages of Pekin, Shanghai and Canton. Young Americans who can combine a business training with a knowledge of this language have a bright and remunerative future.

Jane ate cake and Jane ate jelly,
Jane went to bed with a pain in her—
Now don't get excited,
Don't be misled,
For what Jane had was a pain in her head.

Every time you read Popular Mechanics you will like it better.

STEEL FRAME FOR CONCRETE BRIDGES.

Cement for building small bridges and culverts is coming into general use. The completed structure is not only strong and sightly but is easily constructed. To facilitate the erection, steel



Steel Frame for Cement Bridge.

frames are now prepared of the desired dimensions, and after being placed on the foundations the cement is mixed and poured around the steel frame, being held in place by molds, until it sets. The expense of these cement bridges is not great and they are very durable.

The Whitaker estate lying in the Bank of London awaiting claimants has long been represented to be worth millions for the purpose of obtaining contributions from alleged heirs. The estate amounts to just $500.

LOCOMOTIVES OF A CENTURY.

In this, our closing chapter on "Locomotives of a Century," we present illustrations of the most modern passenger locomotives used on American railroads to-day. These are recognized by mechanics everywhere as being the greatest railway engines in the world. For speed, durability, skillful construction, safety, convenience and graceful appearance their equal does not exist in any other country. These are the engines that have made America famous for its splendid transportation facilities, and have caused Uncle Sam to be regarded as the builder of locomotives for the world. These engines at the present time appear to be the climax of the mechanic's skill and it seems nearly impossible that they could be greatly improved upon. But while by many builders of to-day they are regarded as perfection, another decade may make them appear as ungainly as many we have shown in past issues. It will be a source of amusement for our readers to contrast these engines with Trevethick's model, 1800, Fig. 1, the world's first high pressure locomotive, described and illustrated in Popular Mechanics, April 12. The engines herewith shown are the crowning results of the efforts began with the Trevethick model in that early day. Will the locomotive of another century make these look equally ridiculous in comparison? If the progress should be as great in the next century as in the past we will then be hurled from place to place with the speed of a cannon ball.

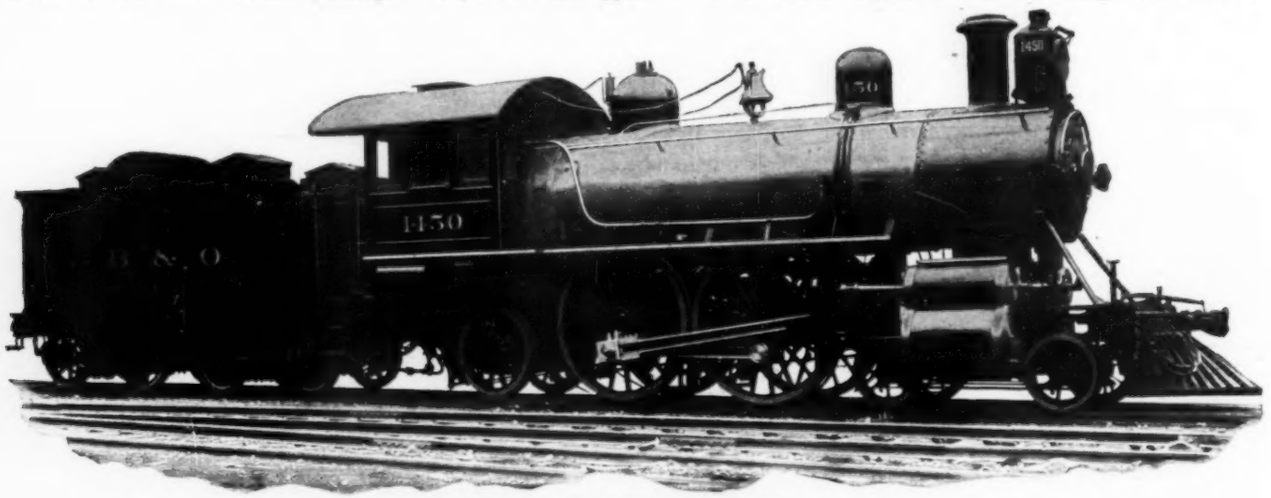


Fig. 46—Atlantic Type, B. & O. R. R.

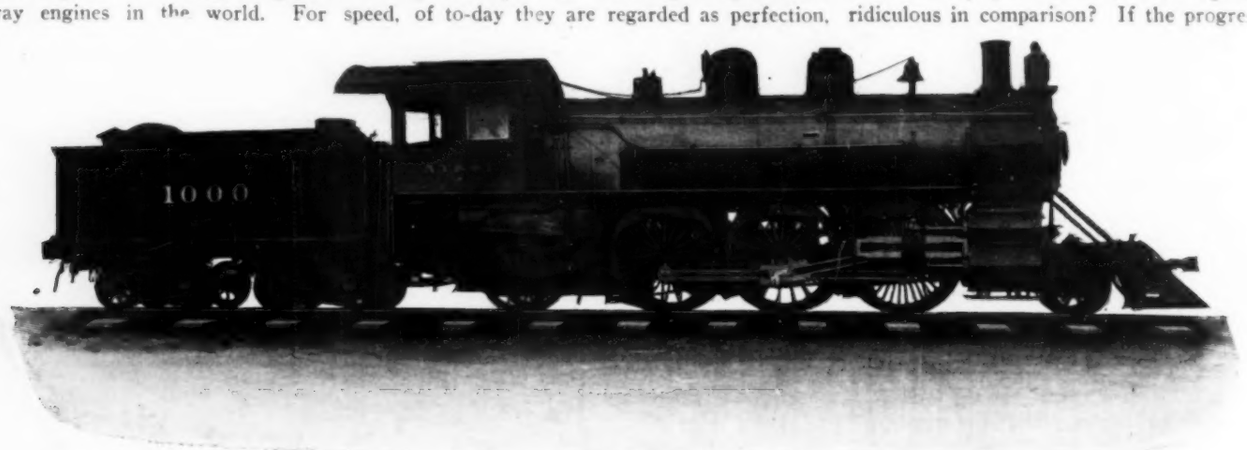


Fig. 47—Prairie Type, A. T. & S. F. R. R.

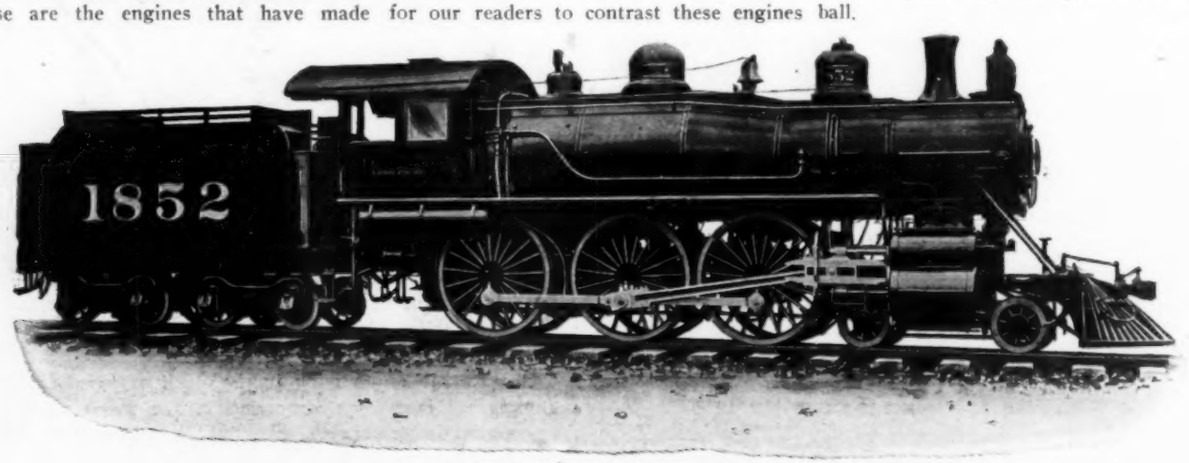


Fig. 48—Ten-Wheel Type, U. P. R. R.

These models, herewith illustrated, are of the same type of engines previously described, only later models. Fig. 46 shows the Atlantic type, recently built by the Baldwin Locomotive works for the Baltimore & Ohio railroad. This engine has a straight boiler with a working pressure of 200 pounds; there are 300 boiler tubes, each 2 inches in diameter and 16 feet 1 inch long; the total heating surface is 2663 square feet; grate area 42.5 square feet; diameter of driving wheels 78 inches.

Fig. 47 illustrates the Prairie type of passenger locomotive in use on the Atchison, Topeka & Santa Fe railroad. It is guaranteed to traverse curves of 16 degrees without difficulty. It has cylinders of 17 and 28 inches by 28 inches; boiler diameter 70 inches; working pressure 200 pounds; length of firebox 108 inches; width 71¼ inches; total heating surface of 3738 square feet; driving wheels 79 inches in diameter.

Fig. 48 is the Union Pacific ten wheel type. It has cylinders 15½ and 26 inches by 28 inches; wagon top boiler; working pressure 200 pounds, 350 boiler tubes, 15 feet 6 inches long, 2 inches in diameter; total heating surface 3,011 square feet, grate area 32 square feet; diameter of driving wheels 78 inches.

NEW NECK-YOKE.

The illustration of the latest thing in a neck-yoke requires no explanation. The yoke is made in two pieces each fastened

New Idea in Neck-Yoke.

permanently to the pole. If one horse pulls ahead of the other it does not interfere with that part of the yoke on the other side.

FLEAS ARE WILD ANIMALS.

The custom house officials in Switzerland have decided that a box of trained fleas should be classed as "wild animals of a menagerie." How about the people who are bitten by them?

A patent has been granted E. A. Post, of Allegan, Mich., on a mold for making burial caskets out of paper-board.

Yankee Cultivator Driven by a King

Alfonso XIII Does Not Think it Beneath His Dignity to Till the Soil with American Farm Implements

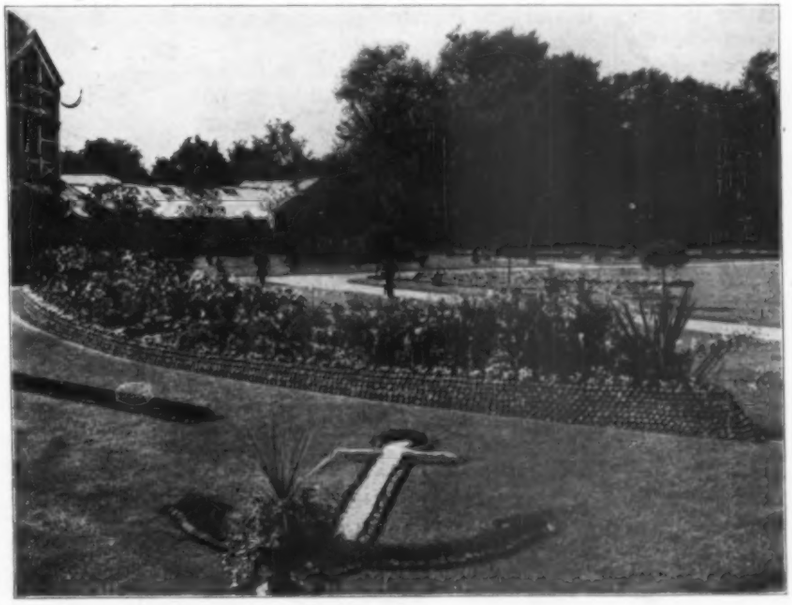
The young king of Spain is turning his attention to the agricultural development of his domain. In this, he says, more than in its success in arms, rests the future welfare of his country. That he does not consider farm labor beneath the dignity of a king is demonstrated by the accompanying illustration showing King Alfonso XIII driving a team to a cultivator on the farm of the Count of San Bernado, the prospective minister of agriculture. He is surrounded by high dignitaries of the nation. The king is taking a personal interest in the methods of agriculture in Spain and through his efforts modern farm implements are being introduced to splendid advantage. He believes in the use of the best and most improved implements no matter if they have to be imported from the nation with which his country was but recently at war. The cultivator he is driving was made in America and is but one of many large shipments recently made into that country by the International Harvester Co., of America, the machinery being shipped from Chicago by the Deering division.

King Alfonso Riding in a Deering Cultivator.

The Bellaire (O.) Steel Works produced 54 heats of 540 tons of steel in one 12-hour turn, and made 1,000 tons during the 24 hours.

A party of four Grand Rapids, Mich., people have completed a tour of 4,000 miles through Europe, in an automobile.

Lippincotts for October is an unusually good issue. The complete novel is "Fruit Out of Season," by Mary Mass.



Floral Boatful of Plants at Humboldt Park, Chicago, Max Kleppin, Gardner.—Courtesy of the Florists' Weekly Review.

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COLD AND HOT ZONES UNDERGROUND.

Recent Tests Disprove Theory That Heat Increases Uniformly With Distance Down.

Are there cold and hot zones below the surface of the earth just as there are on the surface? Recent developments would tend to prove that such is the case and that the long accepted theory that heat uniformly increases with descent into the interior of the earth is wrong. It has recently been shown that heat generated by oxydization is often a deterring or determining factor in deep mining. In sundry localities it has been noted that the increase in temperature with depth is not regular, being subject to the amount of pyrites in the ground, or to the time that the hole in the ground is opened up. At Sandhurst, Victoria, N. S. W., a fall of five degrees, F., in temperature was noted after the ground had been opened up for one year, and after four years had lapsed there was a further fall and then an unchanged temperature.

The Mining and Scientific Press in relating an instance at Comstock, Nev., says: "At a depth of 1,700 feet boiling hot water was found, and the statement was then made that a little further down all matter was molten, yet on passing the 2,000-foot level the temperature decreased, the Union shaft at a depth of 3,500 feet having a more comfortable temperature than could be found half way to the surface."

In the Lake Superior region these irregular conditions are conspicuous. Here there appears to be a local cold zone, as is demonstrated in the Calumet & Hecla shaft, where at 4,700 feet the temperature was 79 degrees F., or only 20 degrees warmer than at a depth of 100 feet.

The work of modernizing China is progressing with three-fold energy. Large quantities of railway construction material are constantly arriving from America and work is being pushed on many railroad lines.

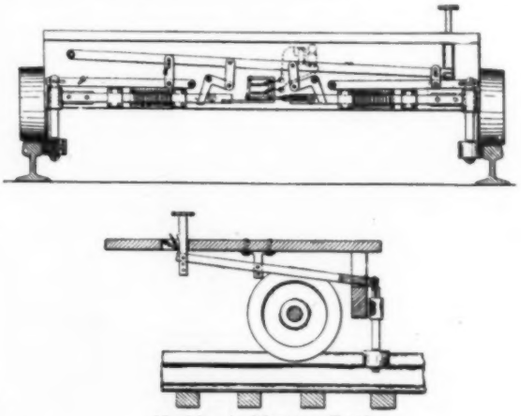
Popular Mechanics prints the best of the best things published.

WHAT WE ARE COMING TO—THE STEEL AGE

Prof. Doolittle says that in a million years the earth will be a frozen mass of metal; then Mr. Morgan will be in his element.—Copyrighted 1902, Chicago Journal.

MACHINE TO TEST GAGE OF TRACK.

The inspector of railroad tracks can now glide swiftly along in a comfortable little car propelled by a gasoline engine, and the machine will do the inspecting. The Railway Review says: Gage wheels running on vertical axles are held against the sides



Machine to Measure Track.

of the rail heads by spring pressure. If the rails have spread, the gage wheels in following the rails are moved farther apart by the springs and instantly close an electric circuit which sounds an alarm bell. A foot lever raises the gage wheels to clear frogs and crossings.

FIREPROOFING COTTON GOODS.

Cotton goods, especially those made of heavy yarns and "combed out" on both sides to imitate flannel, are next to an explosive as a combustible. A German mill has introduced a process of "asbestimizing" the fabric, which renders the goods, not fireproof, but not easily burned. It is not a chemical process, does not wash out, and the cloth can be worn next to the skin.

All newly commissioned British ships will in future be painted gray; the hulls, funnels, masts and boat being all of the same shade.

BUILD DAMS TO ENRICH FARMS.

Nearly everyone has read of how the waves of the great lakes and oceans have thrown up sand upon the shore until the owner of a small lot in time became the possessor of large and valuable lands. In Chicago, for example, this accretion, aided by dumpings from street sweepings, has extended the shore line in places fully a half-mile out into what were once good fishing grounds.

A Nebraska farmer, L. C. Burnett, of Otoe county, has adapted this idea in a different way and made valuable land out of what was before almost worthless. He observed that each heavy rain carried into brooks and rivers great quantitles of surface soil, of very rich quality. He estimates the loss of soil to Kansas and Nebraska, in earth which has gone down the Missouri river each year, as even greater than all the loss from drouth. His method is to erect dams across water courses on his farm and catch the waste soil. He says: When I first began to dam up the draws on my place fourteen years ago, I had no idea of the results that have since taken place in the saving of soil. The first pond I made was 10 feet deep, 520 feet long by an average width of 50 feet. Now this is full and the soil much higher than the original level of the water; about 12 feet of fill in the two ponds and the draw leading into them. I have caught what would amount to one foot of soil from four acres of ground, and in the two reservoirs on the north side of my place, made during the past two years,I have caught half as much more soil,so in round numbers I have caught from my neighbors' farms one foot of soil one rod wide and six miles long, or one foot of soil (it's cream if you please) over six acres of ground,and this from only seventy acres. Now this is the result of only a few short years. In the making of a dam, if a large one, clean off the black soil till you are down to the clay subsoil. Then clean off the black soil from where you are to get the dirt to make the dam, of course from the pond side of proposed dam. Utilize this dirt at the back side or ends of the dam. Now you are ready for business. You have a clean foundation, say 50 feet wide and 100 feet long. Begin and lay a layer six inches deep over the whole bottom at once and so continue until completed. Do not make the banks too steep. Put in a day's work now and then when you can.

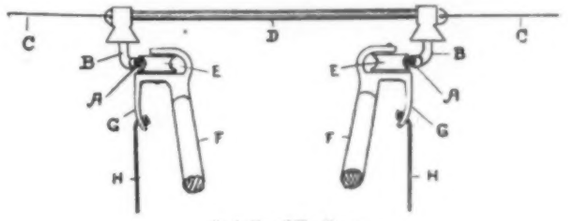
A neighbor has this year caught soil-wash enough to cover an 80-acre piece to a depth of 18 inches, and this year has 200 acres of corn above high water mark, where a few years ago there was a slough. On this piece there is a fill of about eight feet. Another neighbor built a dam on his farm that backed water 300 yards and at the deepest was eight feet deep. Just one rain filled this to the top with dirt that came down with the rush of water from the corn fields, over which as soon as it was settled he hauled the largest loads of hay.

The Mississippi empties each year into the Gulf enough of the richest soil in the world to cover thousands of acres to a depth of 10 feet.

TRACKLESS TROLLEY CARS FOR NEW ENGLAND.

Will all the street cars give way to easy-riding autos, and the car tracks be removed and leave a smooth, unbroken surface to the pavement? This is a question many are asking. The trackless trolley car is attracting a great deal of attention these days. Since the publication in Popular Mechanics of Aug. 23 of the remarkable system now in operation in Europe, it has been announced that an American company is about to establish a similar line at Lowell, Mass., with extensions in the near future to various parts of New England. Our readers will recall the system as that of a spacious vehicle, on rubber-tired wheels, propelled by an electric motor like a street car and taking current from overhead trolley wires.

The Lowell cars or carriages will each seat twenty passengers. Instead of the cumbersome trolley apparatus used abroad, the American line will have two trolley poles with horizontal trolley wheels in place of the vertical wheels on our street cars. Two wires are necessary, as one is required to carry the return current back to the power-house, which passes through the track

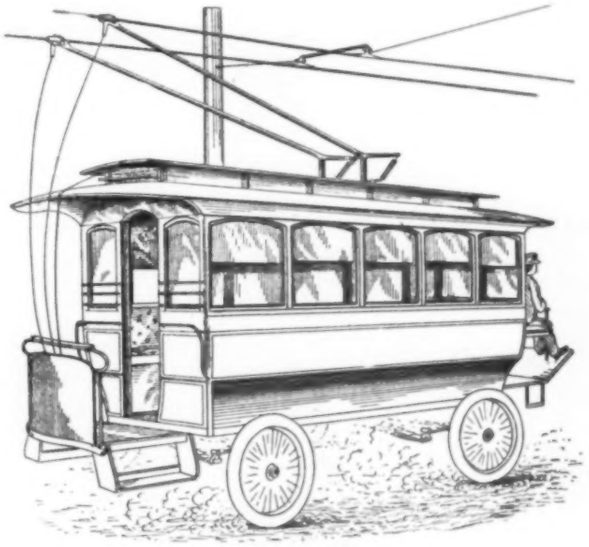


Details of Trolleys.

rails of our street car lines. The Street Railway Journal gives the following explanation of the new trolley device:

The reference letters AA indicate the trolley wires; BB, the wire-hangers; CC, the stay wires; D, the wooden bar joining the hangers; EE, the trolley wheels; FF, the trolley poles; GG, the bearing extensions for guiding the trolley wires into the grooves of the trolley wheels, and HH, the cords reaching from the bearing extensions into the reach of the car conductor.

Only two overhead wires are necessary, as cars can pass by one pulling down its trolley while the other goes around, the trolley poles being arranged to swing around in any direction. On a large city line two sets of overhead wires would be desirable. The small expense of constructing these trackless lines



Trackless Trolley Car in Massachusetts.

will doubtless lead to many being built where costly tracks could never be made to pay.

In the French trackless car described in Popular Mechanics Aug. 23 the trolley weighed 40 pounds and required a small motor to move it along on the overhead wires. The American system does away with this and is much better.

TURNED TREE INTO NEWSPAPER IN 145 MINUTES.

A foreign paper tells of an experiment that was made to see how quickly a tree could be turned into a newspaper. At 7:35 A. M. a tree was sawed down. Just two hours later it had been converted into pulp and paper. At 10 o'clock the first printed and folded copy came from the press. In 145 minutes the tree had been turned into a newspaper. It is now up to the Yankee to beat that record.

Copyrighetd 1902 by F. J. Trost.

Panoramic View of the great Spindle Top Oil Fire.--Fi

TOMMIE OHLSEN SURPRISES. THE NATIVES.

We was getting into the harbor then, which was the other side of an opening about forty feet wide, where the ends of the two quays didn't quite come together. It was a nice little harbor inside, but crowded this time with all kind of craft, all in from the gale.

"Is there room, do you think, Skipper?" I says when we began to get pretty near.

"Oh, we oughter be able to squeeze in," says Tommie.

"You must not, you must not." says the pilot. He'd been a sort of a passenger since we'd got the channel fixed in our minds, but now he was comin' to life again—assertin' his authority like. "You must not," he says, speakin' up to Tommie.

"Hush," says Tommie.

"But I won't take the responsibility," says he.

"I'll take it off you," says Tommie.

"But I'm pilot," says he.

"But I'm skipper," says Tommie.

"But you must not," says he.

"Mustn't hell!" says Tommie, gettin' mad. "Let her swing," he says to me at the wheel. "Give the Nannie O a full and let her roll!" And through the passage she went flyin' and the waves from under her bows went up against the quays like she was an ocean-liner hooked up.

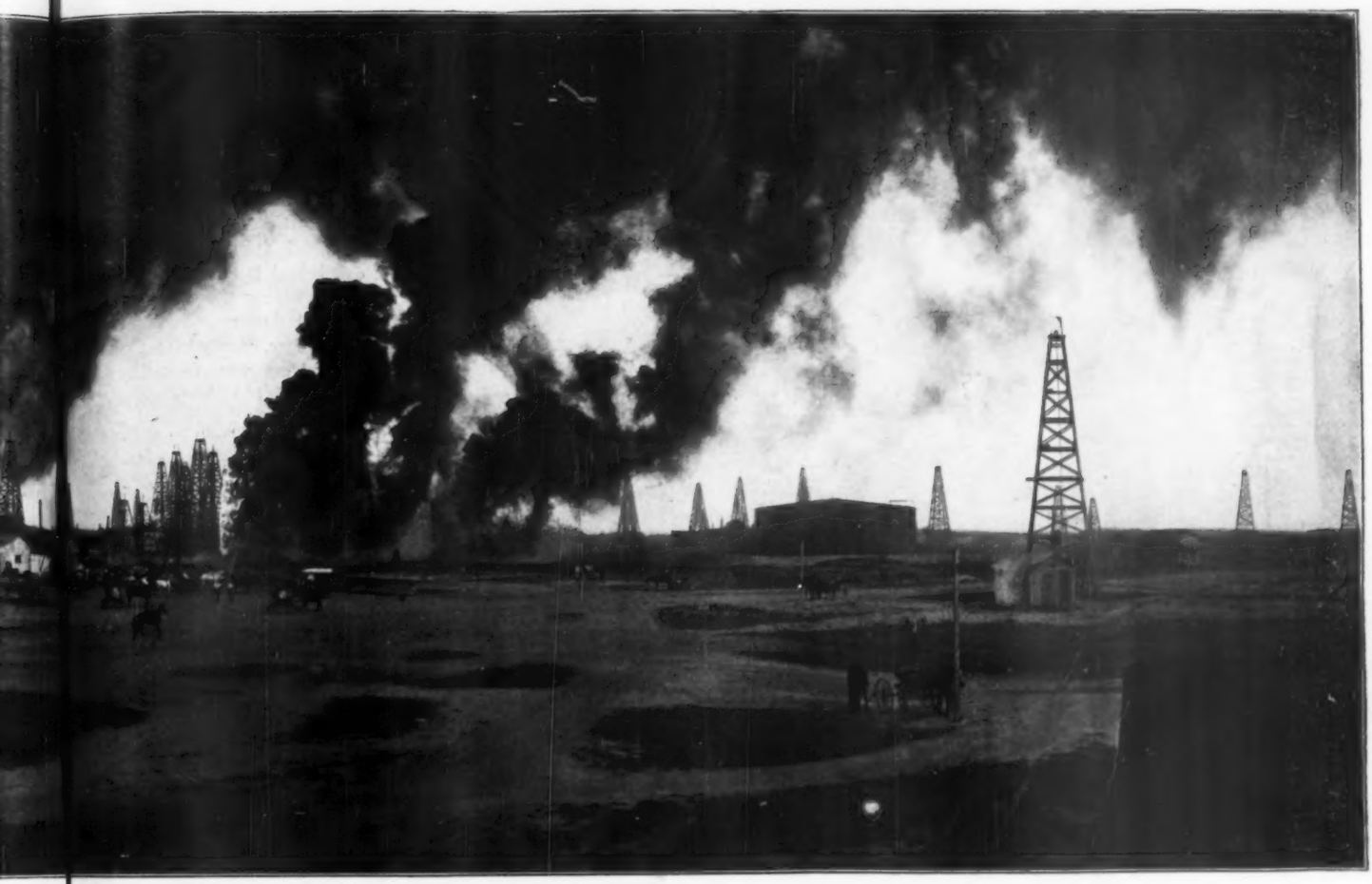
And when she got in! On the deck of every vessel in the harbor they crowded to see who was the strange schooner comin' in carryin' her tops'ls when everything under sail that day had come in with what they had in the way of lower sails reefed down. Tommie went to the wheel himself and, man, you ought've seen him shoot her! Up she came, and whing! My soul, I thought she'd go another quarter-mile the way he slammed her into the wind. And she would have, only just in time he sings out and cl-i-i-nk! over goes the anchor, and wh-r—down comes jibs and fores'l, and there we was all standin'. Our mains'l was shakin' in the wind wild as could be and the reef-points on it crackin' like a hundred whips, but there we was sure enough right in the middle of them all, with their eyes poppin' out at us. "Break out her flag to the main peak and let 'em know what country this one's from," says Tommie.—October Scribner's.

The manufacture of violin strings, an art heretofore confined to Europe, is now being successfully accomplished at Grand Rapids, Mich.

REHEATING COMPRESSED AIR.

The rapidly increasing use of compressed air is directing attention to European practice where it has been generally used for power purposes—chiefly driving small motors—for many years. The reheating system consists in passing the air compressed say to 70 or 80 pounds per square inch, through a coil of hot pipes. The air is thus raised from a temperature usually about 60 degrees to 350 degrees which has been found to be about the highest practical point. This increase in temperature and expansion of the air is accomplished by the burning of only one-fifth of a pound of coal to develop one horse-power per hour. It takes from two and one-half to five pounds of coal per horse-power hour to operate the compressor. By the reheating system the capacity of present plants may be greatly increased, and frequently will avoid putting in larger compressors.

The Mining Reporter says: About 1888 a gigantic air compressor plant was erected in Paris for the purpose of delivering cheap power to small factories, private houses and for such general purposes as power is needed in large cities. The city of Paris was dotted with stations for compressing air, one being laid out with a capacity of



e.--Photograph Taken on the Morning After Fire Started.

24,000 horse-power, although we are not aware that this amount of power was ever generated. The system was designed by M. Popp, the famous French engineer. At first the air was used in the condition in which it left the stations, but with very unsatisfactory commercial results. Indeed it appeared, at one time, as if the system would have to be condemned. In this dilemma Popp commenced experimenting with small and crude reheaters made of coils of pipe and heated by coke or city gas. The result was a saving of nearly forty per cent in the consumption of compressed air.

WHY POWER FROM LIQUID AIR WAS A FAILURE.

A few years ago when liquid air was new we were told it would revolutionize the power problem. A passenger train was to run from New York to San Francisco on a barrel or two, and a small express wagon would haul enough in one load to take the largest steamer across the Atlantic. Now it is unknown outside of laboratories, and in fact only four universities in the country are equipped to make it. Careful tests last week at Cornell university demonstrated the fact that a one-horse power engine working continuously for one hour could produce only enough liquid air, when converted into power, to run a one-horse-power engine one minute.

CAUTIONS PHYSICIANS SHOULD OBSERVE.

By Dr. A. G. Young, Secretary of the Maine State Board of Health.

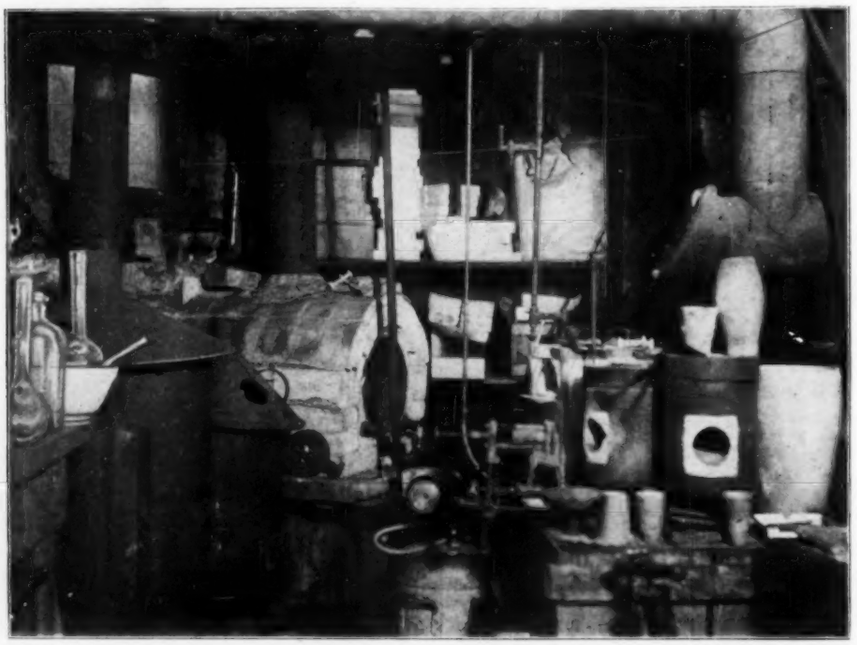
When visiting cases of smallpox, diphtheria or other infectious diseases my method of procedure is to leave my overcoat, hat, undercoat—and usually my collar and necktie—outside the house containing the patient. I call for an earthenware wash bowl from the house, and a quart of hot water—nothing else. From a small and tightly closed bag I take out a bottle of bichlorid tablets, one or two of them I drop into the wash-bowl to be dissolving while I am inside, then I take out and slip on a pair of white duck trousers, then a barber's white coat with an extra button which buttons up closely around the neck. Rubber bands around the ends of the sleeves of the coat and a silk skull cap complete my attire. After I have left the infected room I soak my hands in the bichlorid solution, remove a towel from the grip, a two-ounce vial of formaldehyde solution, and two surgeon's hand brushes. I then take off the white coat and trousers, roll them up carefully, and place them in the grip with the cap. I then wash my hands in the disinfecting solution, and wash my wrists, head, face and neck, wetting the hair thoroughly. Dipping the brushes in the bichlorid solution. I scrub down my clothing, particularly the lower part of my trousers and finally my boots. Then all of the remaining things are placed in the grip, the towel on top. Upon this towel I pour an ounce or more of formaldehyde solution, and close the grip immediately. Usually by the time I reach home the things are disinfected, or at least they are in five or six hours. The bag usually remains closed the following night and the next morning is opened and the things are aired for further use

Nine hundred miles of almost continuous trip by trolley cars has been made by R. H. Darrah, who travelled from Flint, Mich., to Boston. There were only a few gaps and these will be built over soon

A knife blade may easily be tempered by heating the blade to a red and putting it, edge down, into a piece of rosin soap. When the blade is cool it will be hard enough for a razor.

Huge Gold Brick Industry in Chicago

Transactions Involving Thousands of Dollars Carried on with Full Knowledge of Police



Where the Gold Bricks are Treated.

A Chicago manufacturer went to a well known place and paid $10,000 for some metal. When he got the metal to his establishment he found that he had bought a pile of gold bricks; yet he made no effort to get his money back; he did not even notify the police authorities and in fact seemed not the least disconcerted over his discovery. He went back to the same establishment a month later but, instead of having the place raided, bought several thousand dollars worth more of the same metal. This, of course, proved to be another pile of gold bricks. Instead of bemoaning his fate this man turned around and sold the metal in a different form to other parties at a big profit. Now he buys the same metal all the time and is carrying on a regular business of dealing in gold bricks. His purchasers have never lodged complaints against him and the police have made no efforts to interfere although the chief of detectives and many of the city authorities have accurate knowledge of the transactions.

This is not a dream nor the results of association with Lake Geneva fishermen. It is the truth. For the gold bricks that this man buys and sells are real, solid gold. They are bought from the boullion department of the First National Bank, where thousands of dollars worth of them may be seen stacked up at any time. The purchaser in question is but one among several. He transforms the gold and sells it for ornamenting of glass ware, porcelain, etc., for the manufacture of gold pens and jewelry, and also for the use of assayers and dentists. "Brick," an authority on bricks of all kinds, gold and otherwise, thus describes the process of transforming the gold into the solution used for ornamenting glassware:

"The gold brick is broken up into suitable sizes for weighing into small parts which are placed in glass chemical flasks. These parts are then treated with nitromuriatic acid, which dissolves them, heat being applied from the bunsen burners beneath to facilitate the dissolution. The chlorine fumes are carried off by a special device. The necks of the flasks fit into a long box-tunnel in communication with a chimney, up which the fumes are carried and dissipated in the upper air. The progress of dissolution has to be carefully watched. The residuant gold solution, which has assumed a reddish-brown color, is then transferred to larger receptacles, and precipitated with ferrous sulphate. This precipitate is then thoroughly washed, dried, and mixed with oil and a flux, to make it adhere to the ware when it is fired. The gold thus mixed is ground with special machinery, worked by electric motive power, and emerges from this mill looking very much like brown paint."

$70,000 Worth of Gold Bricks.

TECTORIUM FIREPROOF SUBSTANCE WHICH ADMITS LIGHT.

Tectorium is a new article for use in building construction. It is a German invention, and its manufacture a secret. A prepared mass is spread on a wire web. It will bend, can be cut with a knife and is fireproof. It will admit light but is not transparent. It is cheaper than glass and unbreakable.

WANT AMERICAN EQUIPMENT.

American manufacturers are invited to furnish John Denham, electrical engineer of the Cape Government Railways, Cape Town, South Africa, catalogues with prices, discounts, etc., of steam, oil and gas engines, pumps, steam piping, electrical fittings, cables and wires, arc and incandescent lamps, switchboards, measuring instruments, etc. Where prices are subject to fluctuations an approximate price should be stated.

BIG IMPORTATIONS OF STRUCTURAL STEEL.

Surprising as it may seem in view of the American facilities for manufacturing structural steel the supply is not equal to the demand caused by the large amount of construction work going on in different parts of the country, and millions of pounds are being imported to this country from England, Scotland, Belgium and Germany. Between April and September 1 there was landed at the port of New York 13,074 tons of structural steel, valued at $299,524. Between September 1 and 15 there was deposited on the New York wharves from Germany alone 1,466 tons, valued at $35,588, and between April 1 and September 1, 7,127 tons were bought in Germany at a cost of $172,946.

The dried currant crop of Greece this year amounts to 330 million pounds. The government will not permit export of more than four-fifths of the crop at present in order to better prices.

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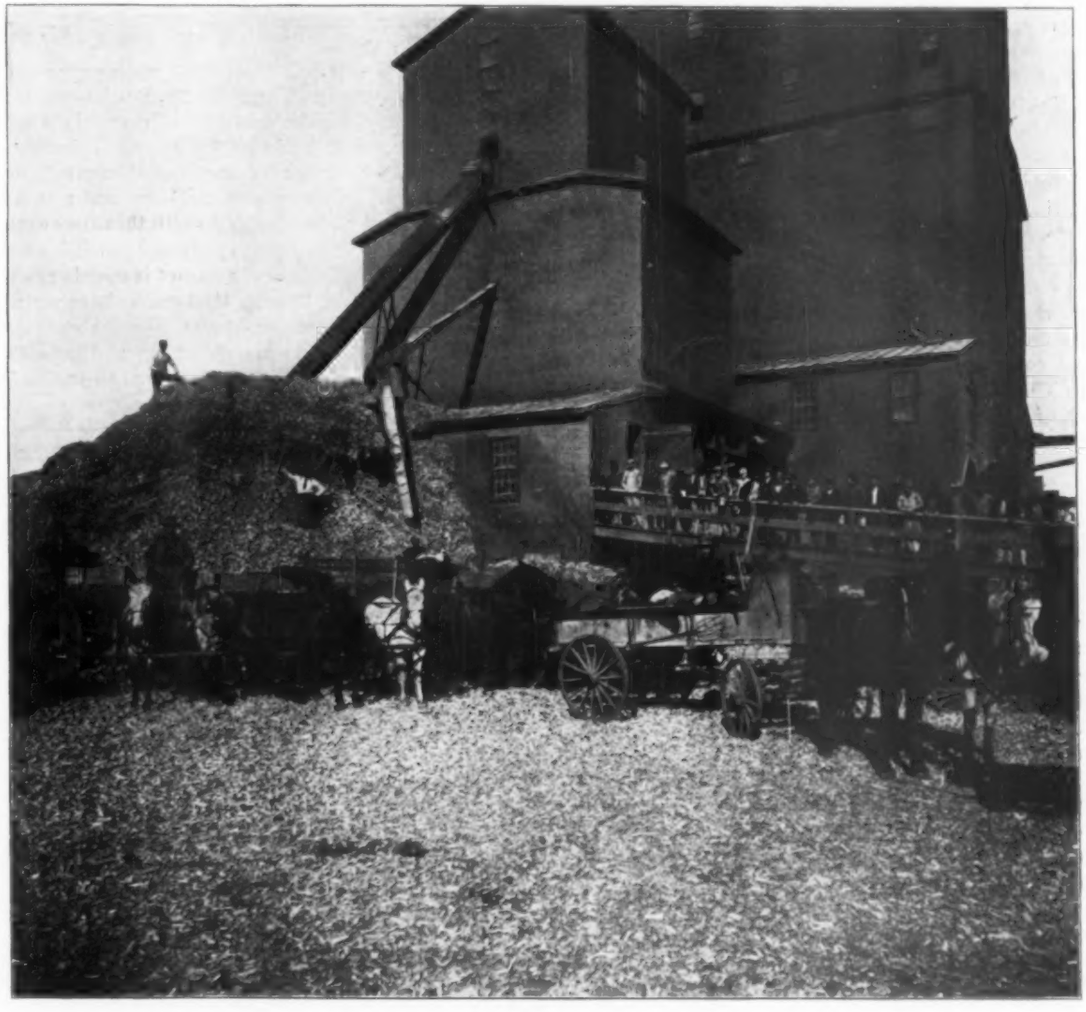
USE CORN COBS FOR FUEL IN KANSAS.

People of that State Independent of the Coal Trust.

In Kansas, where corn is plentiful, corn cobs are being used extensively for fuel since the recent great advance in the price of coal. The result is that the cobs have become an item of considerable commercial importance and are sold to the residents of the towns and cities at good prices for the wagon load. When coal was cheap the cobs were waste and men were paid to haul them away. Now they bring handsome returns to the farmers and grain elevator operators.

In the past when the price of corn went so low that it was cheaper than coal as fuel, corn was used for cooking and heating in Kansas. So if the price of coal should advance to such an extent that it would be more expensive than corn as fuel, Kansas may once more resort to this practice.

An idea of the bounteous amount of corncobs obtainable in Kansas is given in the accompanying picture showing a grain elevator at Winfield, Kan. While corncobs are stacked high about many Kansas elevators, this is said to be the largest pile ever seen in Kansas or any other part of the world. Besides being strewn thickly over the ground on all sides the great stack to the left, it will be seen, towers above the second-story of the elevator. The cobs are the refuse of the elevator after the ears have passed through the sheller. They are run down from the top through the chutes shown in the engraving. They will be hauled away to homes and factories and used in the place of wood and coal.



Largest Pile of Corn Cobs Ever Made.

CORNELL WOMAN ENGINEERING STUDENT.

It has been officially announced at Cornell university that next year, for the first time in the history of the university, a woman student would enter the engineering department. She is Miss Nora Stanton Blatch, of London, England, 20 years old, and a granddaughter of Elizabeth Cady Stanton.

PIANO TYPEWRITER MAKES INSTRUMENT PRINT MUSIC.

A piano typewriter, which will write music while the piano is playing it, has been invented by Paul J. Cienanth, of Buffalo, N. Y. If a composer has a desire to write a new piece of music, all he has to do is to attach the new invention to the piano and play what he thinks will make good music. When he finishes the notes he has played will be printed on a sheet of paper and will be ready for publication. The time and all will be arranged on the paper just as the music was played. If he holds the note for a quarter, a quarter note will be printed; if he holds the chord for two beats, a half note will be printed.

A big truck wagon, loaded with siphon and soda pop bottles was overturned recently in Kansas City. The explosion of the hundreds of siphon bottles charged with the carbonic acid gas sounded like the roar of heavy artillery. The noise was deafening and caused people to rush to the streets in terror.

SHOP NOTES

WHO WILL PERFECT A GAS TURBINE?

Honor and riches await the inventor of a successful gas turbine engine. It is only within the past two years that general attention has been directed to the steam turbine. Until 1890 this type of engine was non-condensing and built only in small sizes. They justly deserved the name of steam eaters, and to start most of them was equivalent to opening wide the safety valve of the boiler. They are now being built in large units, and compare favorably in economical operation to the best triple expansion types.

In an address before the English Municipal Electrical Association, S. E. Fedden said:

"The construction of the steam turbine is simplicity itself, as it consists only of a hollow drum revolving in a stationary drum or cylinder, each with teeth or vanes attached, and so arranged that they clear each other. The two cylinders are steam packed, and of course the thrust guides require careful adjustment so that the vanes do not clash. Of late years this turbine engine has been meeting with signal success, and many engineers are now considering whether it is not destined to revolutionize the means of obtaining power from steam both by land and by sea. Engineers and inventors should turn their attention towards bringing to perfection gas turbines, now that cheap gas is available, and the ideal engine, combined with the most economical way of obtaining electrical energy from coal, may then result."

The simplicity of the turbine engine makes it easy of installation. A 750-horse-power turbine was connected and at work in three days from the time it arrived at Sheffield.

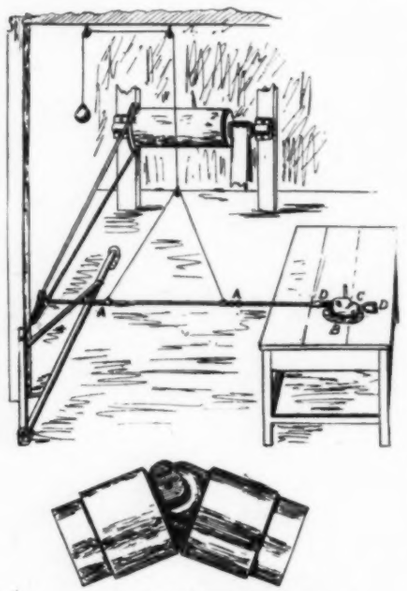
CRUCIBLE STEEL FOR TOOL MAKING.

The committee on tools reported to the National Railroad Master Blacksmiths' Association as follows: We recommend the following grades of crucible or carbon steel: Select for lathe, planer, slotter, screw cutting, dies, etc.; second grade for chipping chisels, hammers, etc., that have to withstand shock, and the third grade for hot punches, fullers, flatters, setts, etc. Your experience coupled with good judgment will prove the best guide for selecting the best steel for the purpose to which tool is to be applied.

To secure best results select a good steel for the purpose for which the tool is intended; have a clean fire, a deep body of fuel to prevent the cold blast from getting through; heat slowly and thoroughly; use judgment in forging, turning the steel over and over and upside down frequently; see that your anvil is nice and smooth and never try to temper on the same heat for forging unless it be a track pick. For machine tools, after forging, to shape, lay aside till cold, then reheat as above in a clean, deep, bright fire slowly and thoroughly, not any higher than is necessary to get the necessary hardness; then dip in your cooling bath. For lathes, planers, etc., we do not think it is good policy to draw temper; a little practice with dipping will be found as satisfactory, and more so.

HOME-MADE SHOP SANDER.

I have made a sandpapering machine, says a correspondent of the Wood Worker, which I think others would find very



Sand-Papering Machine.

useful in the wood shop. Sketch herewith shows it. The shaft is of ⅞-inch round steel. A A are two universal joints; B, disc of wood on which the sandpaper it tacked; C, hood to protect the spur gear, which forms also the boxes for the spindle and shaft, and D D, handles.

I use a tightener and brake on drive belt, so it can be stopped in an instant.

Steel car wheels are to be made by an entirely new process at a large plant to be erected at Butler, Pa. The equipment includes a forging press that will weigh 400,000 pounds.

An iron company in California has met with such great success in smelting ores with crude oil, that it now appears as if a new and important outlet for oil as fuel had been opened.

ROCK DRILL AS POWER HAMMER.

The engineer at one of the Cripple Creek mines improvised a power hammer out of a rock drill by substituting a hammer for the drill point. An ordinary anvil was placed below the machine, which had been taken from its tripod and set up in a vertical position. It was driven with compressed air, and while it did not strike a ton blow the strokes were rapid and effective. The machine could easily be changed again to a drill at any time.

SWEET SINGING ANVILS.

The sweetest toned anvil is not always the best, as is generally supposed. The husky voiced iron block that would be ruled out of any "anvil chorus" may be very strong of structure and give better service to the blacksmith than the sweet singing instrument. Thus to judge an anvil by its musical qualities is not always a sure guide. Besides, blacksmiths have varied degrees of musical tastes. The old anvil that the smith has pounded for years probably has a ring sweeter to his ear than the "star ringer" in a Thomas orchestra.

CASTING ALUMINUM WITHOUT FINISHING.

The French have already been great experimenters in mixing metals as well as beverages. A foundry concern in that country has now succeeded in making an alloy in which aluminum and tin are the principal metals, and from which the castings leave the moulds in a finished condition ready for use. The castings thus far made are small and very light, and intended for electrical and scientific instruments. No turning, drilling or shaping was resorted to after removal from the moulds.

EASY TO CRITICISE.

"It is easy to sit in the sunshine
And talk to the man in the shade."
It is easy to float in a well-trimmed boat
And point out the places to wade.

But once we pass into the shadows,
We murmur and fret and frown,
And our length from the bank we shout for a plank,
Or throw up or hands and go down

It is easy to sit in your carriage
And counsel the man on foot;
But get down and walk and you'll change your talk,
As you feel the peg in your boot.

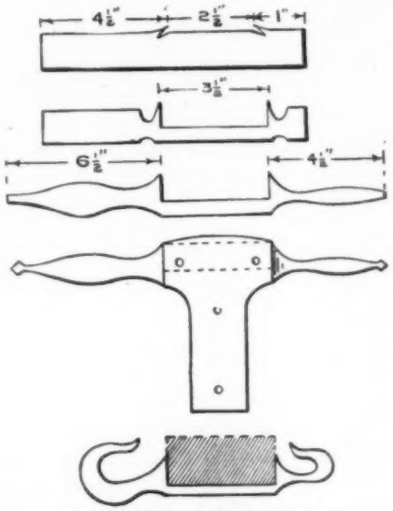
It is easy to tell the toiler
How best he can carry his pack;
But no one can rate a burden's weight
Until it has been on his back.

The up-curled mouth of pleasure
Can preach of sorrow's worth;
But give it a sip, and a wryer lip
Was never made on earth.

—Ella Wheeler Wilcox.

METHOD OF FASHIONING EVENER HOOKS.

The accompanying illustration shows roughly the method I employ in making evener hooks, says a writer in the American Blacksmith. I first nick hot a bar of



To Fashion Evener Hooks.

best quality iron one inch square, and then fuller as indicated by the second figure. With a top and bottom swage I then draw out the two ends, after which I weld on a "T," resulting in such a piece as shown by the fourth view. The large hook may be of steel, if desired. The last step is to shape and bend the ends as indicated by the fifth view.

TO MAKE SEVERAL CASTINGS FROM SAME MOULDS.

A company has been incorporated to exploit a new process which, if successful, is likely to effect to some extent the employment of moulders in the future. The idea is to make "permanent" moulds of iron castings, the inventor having discovered a preparation which is smeared on the insides of sand moulds, thus rendering it unnecessary to break them up when the casting has been made. The plan is to make several castings from the same moulds.

GRINDING STOP COCKS.

To grind a stop cock of any kind, first see that the plug fits the barrel before it is taken from the lathe. Run a half-round smooth file up and down the barrel to break any rings that may be in it; a few rubs of a smooth file back and forth over the plug will break any rings or tool marks on it. Wipe both parts clean. Use for grinding material fine molders' sand sifted through a fine sieve. Mix with water, in a cup, and apply a small quantity to the parts that bear the hardest. Turn rapidly, pressing gently every few turns; if the work is large and the lathe is used, run slowly; press and pull back rapidly to prevent sticking and ringing; apply grinding sand with water until a bearing shows on another part, then use no more new sand, but spread the old that has worked out over the whole surface. Turn rapidly, pressing gently while turning, withdraw the plug and wipe part of the dirt off, and rub on the place a little brown soap; moisten with water and press the surfaces together with all the force at hand, turning at the same time. Remove the plug and wipe both parts clean; next try the condition of the bearing by pressing the dry surfaces together with great force. If the parts have been kept together closely while grinding, and the plug has not rubbed against the lower part of the barrel, the surfaces will be found bright all over and a perfect bearing obtained. If an iron barrel and brass plug are used, or two kinds of brass, a hard and soft metal, soap should be used freely when finishing up, at the tendency to form rings is greater when two different metals are used.

Dr. Holmes said: "The human race is divided into two classes—those who go ahead and do something, and those who sit still and inquire why it wasn't done the other way." It strikes us that the world has not changed, in some respects, since the good doctor's day.

TOO LATE TO CLASSIFY.

CASTINGS AND BLUEPRINTS, 5 sizes boat and sta. 2-cycle gasoline engines; also completed engines; tested, successful. Hildreth Motor Co., Lansing, Mich.

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FOR SALE—193 acres conveniently improved, located in Mills County. Water, grass, timber, orchard, 4-room dwelling. Price, terms on application. W. M. Keith, Star, Texas.

FOR SALE—Patent No. 699,327 automatic track switch for street railways; car need not reduce speed below 8 miles an hour. No impediment to street; easily installed; not expensive. Address, No. 507 Popular Mechanics.

WANTED.—Experienced telephone traveling salesmen; acquainted with Northwest trade preferred, but not essential. The Vought-Berger Company, makers of telephones and Switchboards, La Crosse, Wis.

PLUMBER AND TINNER.—I am in need of a sober and reliable man that can do plumbing, hot water and steam heating; hot air furnace work and tinning; to such a man good wages and steady employment will be given. W. B. Frymire, Bloomfield, Neb.

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WILL EXCHANGE old grandfather's clock for shot gun or optical goods. Address, Patten, optician, No. 615 N. Main St., Torrington, Conn.

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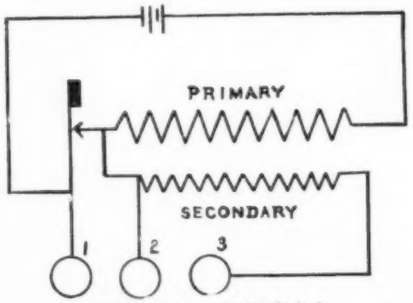
RUSSIAN MACHINE OF DEATH.

At the Russian war maneuvers at Kursk a new and remarkable death dealing machine made its appearance. The English term for the device is "land cruiser." It is a great steel clad vehicle that runs along the ground faster than any man-of-war in the water. It is capable of sweeping down whole regiments of horse and foot, and artillery could do it little harm.

CORRESPONDENCE.

To the Editor: Please give me a plan showing how to connect the primary and secondary coils to a 3-point switch so as to receive on first point the primary alone; the secondary on the second point; and



Connecting to 3-Point Switch.

both primary and secondary on the third point. L. C. P.

Answer: The best way to accomplish this is to use three binding posts, as shown in the accompanying figure. By connecting to posts 1 and 2, current is obtained from the primary; connecting to posts 2 and 3 gives the secondary current alone, while connection to posts 1 and 3 gives a current which is a combination of the primary and secondary currents.

MAIL CARRIER'S ELECTRIC WHIP.

Device That Enables Driver to Remain Inside His Cab and Keep His Horse Moving.

Down in Georgia there is a rural free delivery mail carrier who is too much of a genius to be outwitted by a horse. The carrier's name is James A. Giles and his route is out of Elberton, Ga. Giles drives a horse named "Black." "Black" is an old trusted steed, but he always had to be urged on by the lash. Giles got him a new mail wagon, one of the closed kind that protected him from the elements. "Black" soon learned that when it was raining and Giles was inside the wagon that Giles was a little loth to creep out from under the covering and ply the whip. So wherever it would start to rain "Black" would go slow, and the harder it would rain the slower was "Black's" gait.

How to keep the horse's pace up while he remained inside the closed wagon was the problem Giles was called on to solve. At once his thoughts turned electricity, the agent which seems to provide for every modern need, and here he found the remedy.

Giles made him a magnet dynamo, to be placed inside the wagon; he fixed a pair of copper plates under the harness saddle so that they touched the horse's back; he connected the dynamo to the plates by means of wires which ran along the shafts. To the dynamo he attached a crank. A turn of this crank now answers the place of a stroke with the whip. Now Giles remains in his wagon in all kinds of weather and whenever the slow feeling comes over "Black" Giles simply turns the crank and "Black" is instantly impressed with a desire to strike a faster gait. It has been found that the electrical treatment merely scares the horse and does not injure him. To the contrary Giles thinks it really benefits the animal as it keeps him full of life at all times. Giles has decided to get a patent on his device and it may be used in place of the whip for driving of all kinds.

SETTLE THE COAL STRIKE.

The announcement by the President that the coal strike must be settled will receive national approval. Able jurists have already given opinions that our laws are ample to warrant the judiciary in taking the mines out of the hands of the owners and operating them by the courts through receivers until such time as the owners shall be willing to do so. A great public emergency exists that calls for immediate action by the highest authorities, just as during a great conflagration, epidemic or disaster by wind or flood, martial law for the time being is the only practical government. Concessions should and must be made by operators and miners. Eastern freight rates on coal should also be revised. The Lackawanna road, for instance, charges $2.20 for handling a ton of coal 265 miles. Here in Illinois coal is hauled 380 miles for 80 cents, and at a good profit. The rate should be low, as coal is hauled in open cars and in case of wreck is not greatly damaged.

Whatever special rights either side in the controversy may have must now be set aside, at least for a time, until the greater rights of 80,000,000 citizens have been provided for. It is in no sense a matter of party politics, and the well known character of the President when committed to action may well be depended on to handle this difficult and complex affair in a just but strenuous manner. What the people demand is action and they want it quick.

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Oyster Opener.

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